

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JEON-HWAN SON, SANG-DON LEE
and CHOONGCHEONGBUK-DO

Appeal No. 2000-0260
Application No. 08/675,865

ON BRIEF

Before THOMAS, RUGGIERO, and LALL, Administrative Patent Judges.
RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the final rejection of claims 1, 3-10, and 12-17, which are all of the claims pending in the present application. Claims 2 and 11 have been canceled. The amendments filed June 3, 1998 and November 21, 2001 after final rejection were approved for entry by the Examiner.

The claimed invention relates to a method of fabricating a field effect transistor in which a defined active area of a substrate is doped with phosphorus and arsenic dopants, the arsenic

dopant being doped at a substrate depth not less than or greater than a depth of the phosphorus dopant in the substrate. A gate is formed on the active area with source and drain regions formed adjacent to the gate.

Claim 1 is illustrative of the invention and reads as follows:

1. A method of fabricating a field effect transistor comprising the steps of:

- a) doping an area of a substrate with phosphorus and arsenic dopants, wherein the arsenic dopant is doped at a depth in the substrate greater than a depth of the phosphorus dopant in the substrate.

- b) forming a gate on the area; and

- c) forming source and drain regions adjacent to the gate in the area.

The Examiner relies on the following prior art:

Lee	5,548,143	Aug. 20, 1996
		(effectively filed Apr. 29, 1994)

Claims 1, 3-10, and 12-17 stand rejected under 35 U.S.C. § 112, first paragraph, as being based on an inadequate disclosure. Claims 1, 5, 7, 8, 10, 12, 16, and 17 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Lee. Claims 3, 4, 6, 9, and 13-15 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee.

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Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Briefs¹ and Answer for their respective details.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the Examiner, the arguments in support of the rejections and the evidence of anticipation and obviousness relied upon by the Examiner as support for the prior art rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellants' arguments set forth in the Briefs along with the Examiner's rationale in support of the rejections and arguments in rebuttal set forth in the Examiner's Answer.

It is our view, after consideration of the record before us, that Appellant's specification in this application describes the claimed invention in a manner which complies with the requirements

¹ The original Appeal Brief was filed August 5, 1998 (Paper no. 15). In response to the original Examiner's Answer dated December 31, 1998 (Paper No. 16), a Reply Brief was filed February 23, 1999 (Paper No. 17), which was acknowledged and entered by the Examiner as indicated in the communication dated May 25, 1999 (Paper No. 18). In response to a Notification of Non-compliance, issued by the Examiner as a result of a remand from the Board, a revised Appeal Brief was filed November 21, 2001 (Paper No. 21), and a further Examiner's Answer was submitted dated February 27, 2002 (Paper No. 23). Our references in this decision are to the latest filed Brief (Paper No. 21) and Answer (Paper No. 23).

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of 35 U.S.C. § 112. We are also of the view that the Lee reference does not fully meet the limitations of claims 1, 5, 7, 8, 10, 12, 16, and 17. It is further our opinion that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 3-4, 6, 9, and 13-15. Accordingly, we reverse.

We consider first the Examiner's rejection of claims 1, 3-10, and 12-17, all of the appealed claims, under the "written description" requirement of the first paragraph of 35 U.S.C. § 112. The function of the written description requirement of the first paragraph of 35 U.S.C. § 112 is to ensure that the inventor has possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him. In re Wertheim, 541 F. 2d 257, 262, 191 USPQ 90, 96 (CCPA 1976).

In establishing a basis for a rejection under the written description requirement of the statute, the Examiner has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in an applicant's disclosure a description of the invention defined by the claims. Wertheim, 541 F.2d at 265, 191 USPQ at 98. After reviewing the arguments of

record, however, it is our opinion that the Examiner has not provided sufficient reasons or evidence to satisfy such burden.

The genesis of the Examiner's assertion of the lack of compliance with the statutory written description requirement was the amendment to independent claim 1 which now recites that "... arsenic dopant is doped at a depth in the substrate greater than a depth of the phosphorus dopant...." Independent claim 12 was also amended to require that arsenic is implanted to a depth in the substrate "... not less than a depth" of the phosphorus. In the Examiner's view (Answer, page 3) the amended language has no support in the original disclosure since the original disclosure is completely silent about the relative substrate depths of the doped arsenic and phosphorus.

After reviewing Appellants' originally filed disclosure, as well as the arguments of record, we are in agreement with Appellants' position as stated in the Briefs. While the Examiner is correct in the assertion, one with which Appellants agree, that the originally filed specification has no explicit statements related to the relative substrate depths of the arsenic and phosphorus dopants, it is our view that Appellants' original disclosure nonetheless provides a clear indication of support for the language of independent claims 1 and 12. As pointed out by

Appellants, "... the subject matter of a claim added to an application after filing need not be literally described in the specification to satisfy the written description requirement of § 112, first paragraph." (Brief, page 9, citing In re Lukach, 442 F.2d 967, 969, 169 USPQ 795 (CCPA 1971). We further agree with Appellants (id.), that "... to interpret what is inherently described in a specification, the specification must be read through the eyes of one skilled in the relevant art."

Our review of Appellants' original disclosure reveals that, while the relative substrate depth relationship of arsenic and phosphorus is not explicitly stated, the ion implantation energy of each is clearly set forth (specification, page 4, lines 20-33). Further, in our view, the evidence provided by Appellants provides clear support for their position that the skilled artisan would recognize and appreciate that the variation of ion implantation energy results in a variation of the depth that doping ions penetrate into a substrate, i.e., the greater the energy, the greater the penetration depth. As set forth in the Wolf and Tauber document² (presented by Appellants in the December 23, 1997 amendment and attached as Appendix B to Appellants' Brief), the

² S. Wolf and R.N. Tauber, "Silicon Processing for the VLSI Era," Process Technology, Vol. 1, page 290 (1986).

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chart of Figure 7 clearly indicates the relationship of penetrating substrate depth of arsenic and phosphorus ions to implantation energy. A comparison of this chart with the implantation energy ranges in the originally filed disclosure, and which also appear in originally filed claims 3, 4, and 15, provide support for the penetration depth relationship of arsenic and phosphorus that appears in appealed independent claims 1 and 12.

In view of the above discussion, it is our opinion, under the factual situation presented in the present case, that Appellants have satisfied the statutory written description requirement because they were clearly in possession of the invention at the time of filing of the application. Therefore, we do not sustain the rejection of claims 1, 3-10, and 12-17 under the first paragraph of 35 U.S.C. § 112.

We consider next the Examiner's rejection of claims 1, 5, 7, 8, 10, 12, 16, and 17 under 35 U.S.C. § 102(e) as being anticipated by Lee. Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. RCA Corp. v. Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.); cert.

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dismissed, 468 U.S. 1228 (1984); W.L. Gore and Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

With respect to independent claims 1 and 12, a review of the Examiner's stated position on the issue of anticipation (Answer, page 8) indicates an inexplicable reliance on the Examiner's position on the issue of the adequacy of the disclosure discussed supra. It is self evident that the standards for establishing a rejection under the first paragraph of 35 U.S.C. § 112 are completely different from those required for supporting a rejection under 35 U.S.C. § 102. In this regard, the Examiner has never attempted to make a showing of how all of the limitations in independent claims 1 and 12 are present in the disclosure of Lee.

Further, our review of the disclosure of Lee makes it apparent that any attempt to read the limitations of appealed claims 1 and 12 on the Lee reference must fail. As set forth in Lee (Figure 1 and the accompanying description at column 4, lines 8-16), the arsenic ions 20 which form the diffusion barrier region 22 are implanted at a shallower depth than the region 18 containing the phosphorus, the exact opposite of what is being claimed in appealed independent claims 1 and 12. Accordingly, since all of the claim limitations are not present in the disclosure of Lee, we do not

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sustain the Examiner's 35 U.S.C. § 102(e) rejection of independent claims 1 and 12, nor of claims 5, 7, 8, 10, 16, and 17 dependent thereon.

Turning to a consideration of the Examiner's obviousness rejection of claims 3, 4, 6, 9, and 13-15 based on Lee alone, we do not sustain this rejection as well. As with the 35 U.S.C. § 102(e) rejection discussed supra, the Examiner has improperly relied on the rationale expressed in the rejection under the first paragraph of 35 U.S.C. § 112 as the basis for the obviousness rejection under 35 U.S.C. § 103(a). For all of the reasons previously discussed, however, the Examiner has failed to establish a prima facie case of obviousness since Lee lacks any teaching or suggestion of formulating a field effect transistor region in which arsenic is doped at substrate depth greater than phosphorus (appealed independent claim 1), or one in which arsenic is doped at a depth not less than phosphorus (independent claim 12).

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In summary, we have not sustained any of the Examiner's rejections of the claims on appeal. Therefore, the decision of the Examiner rejecting claims 1, 3-10, and 12-17 is reversed.

REVERSED

JAMES D. THOMAS)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
JOSEPH F. RUGGIERO)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	
)	
)	
PARSHOTAM S. LALL)	
Administrative Patent Judge)	

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Letty

JUDGE RUGGIERO

APPEAL NO. 2000-0260

APPLICATION NO. 08/675,865

APJ RUGGIERO

APJ THOMAS

APJ LALL

DECISION: **REVERSED**

PREPARED: Aug 5, 2003

OB/HD

PALM

ACTS 2

DISK (FOIA)

REPORT

BOOK